



R-55 5-BAND SHORTWAVE RECEIVER

# ASSEMBLY MANUAL

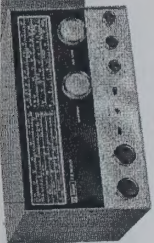
**knightht-k<sup>it</sup>**







# MODEL R-55 SHORTWAVE RECEIVER

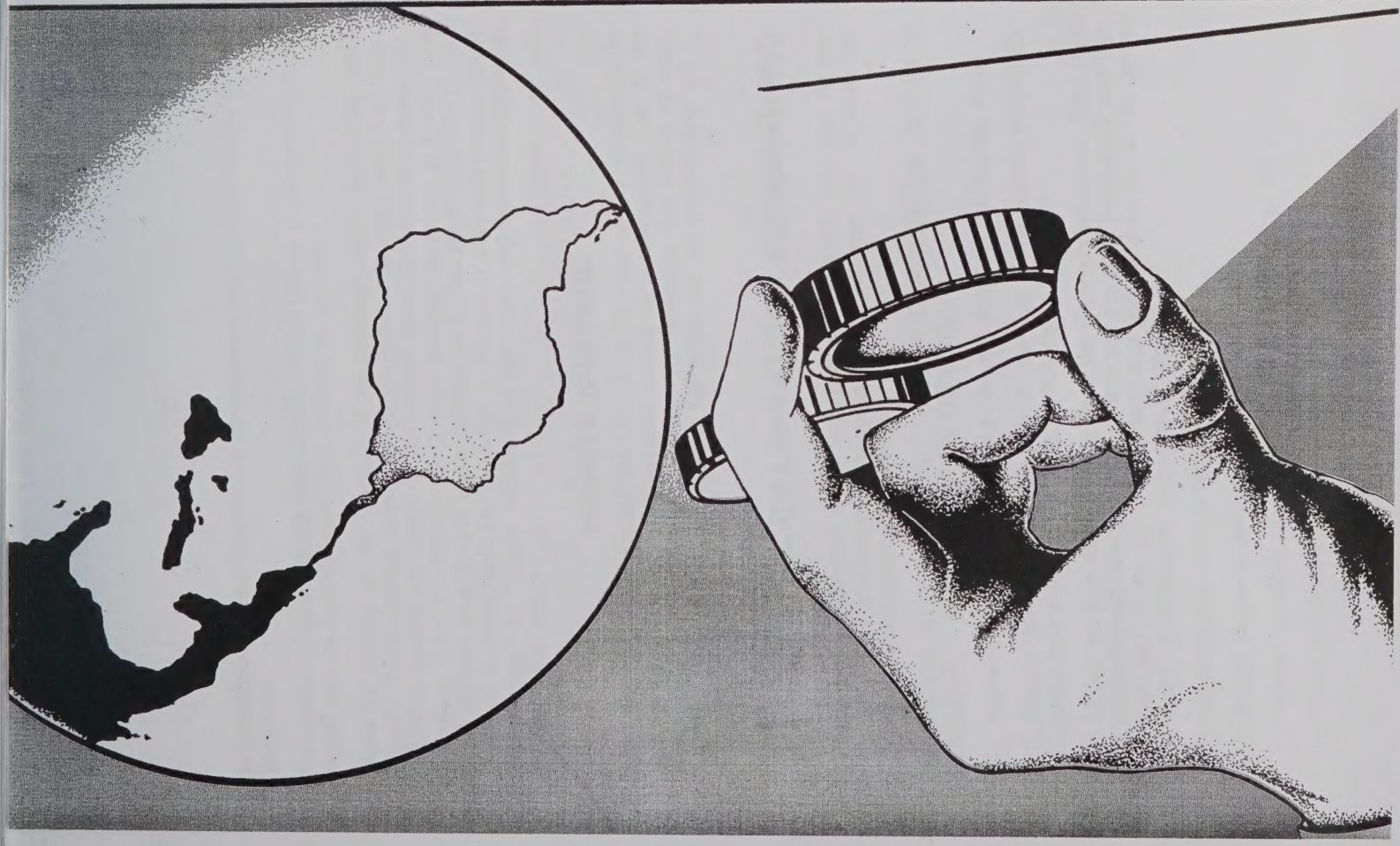


The new **Knight-Kit R-55** is an outstanding general coverage communications receiver. Its up-to-date circuitry makes it an excellent choice for the newcomers to ham radio, shortwave fans, and technician licensees.

**Tuning range** is from 530 Kc to 36 mc with a separate range for the 6-meter Amateur band. All amateur bands from 80 to 6 meters have electrical bandspread individually calibrated to read frequency directly in megacycles.

**Deluxe features include**—2 IF stages for high sensitivity and good selectivity, 1650 Kc IF provides good image rejection, AVC, an effective noise limiter, adjustable BFO for CW and SSB reception, antenna trimmer, flywheel tuning and a handy phone jack.

**Whether you're a beginning Ham** or a shortwave listening fan—the Knight-Kit R-55 will place a world of exciting shortwave listening at your finger tips.









- ☐ is considerably less interference encountered among SSB signals during reception.
- ☐ Reception of SSB signals requires the reinsertion of a carrier before the signal can be demodulated. This is done by the BFO.
- ☐ Start by tuning to the portion of an Amateur band containing SSB signals. While tuning, turn the volume control up until loud, but unintelligible sounds are heard. It will sound something like duck quacking. Carefully tune the BFO control until intelligible sound is heard. The BFO control may be left at its setting while the BANDSPREAD dial is tuned to other stations. However, a change in sideband transmission from "lower" to "upper" sideband or vice-versa requires a readjustment of the BFO control.
- ☐ **REMOTE CONTROL**
- ☐ The two terminals marked REMOTE at the rear of the chassis can be connected to the transmit-receive switch of a transmitter, or to the contacts of a transmit-receive relay. By operating this switch or relay, the B+ voltage for the plates of the tubes can be turned on or off.
- ☐ **CRYSTAL CALIBRATOR (ACCESSORY)**
- ☐ The crystal calibrator is not supplied with this kit, but may be purchased as an accessory. It supplies a 100Kc signal for accurate frequency calibration of your receiver.
- ☐ **NOTE: DO NOT ADD THIS UNIT WHILE THE RECEIVER IS PLUGGED INTO A POWER OUTLET.**
- ☐ Remove the cabinet from the chassis. Remove the bottom plate.
- ☐ Mount the Crystal Calibrator to the top of the chassis behind C-1 using two 4-40 x 3/8" screws, lockwashers and nuts.
- ☐ There are four wires coming from the Crystal Calibrator. Feed these wires through the grommet containing the pilot lamp leads and connect as follows. (It is important that the leads be cut to the proper length to eliminate unnecessary slack.)
- ☐ Solder the red wire to terminal 3 of S-2.
- ☐ Solder the green wire to terminal 1 of TS-1.
- ☐ Solder the black wire to the solder lug attached to TS-2.
- ☐ Solder the brown wire to terminal 1 of TS-4.

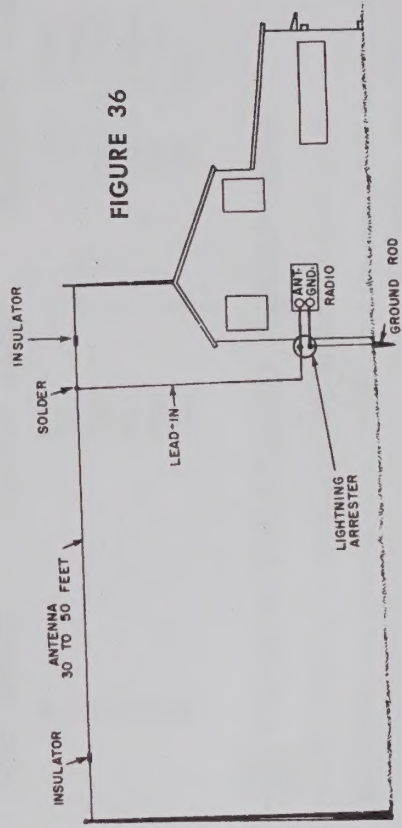
☐ Leave the Crystal Calibrator switch in the ON position to control the Calibrator from the front panel of the receiver.

☐ Remount the bottom plate and cabinet. You are now ready to use the Crystal Calibrator with your receiver. Simply turn the STANDBY-MVC-AVC-CAL SWITCH to CAL and calibrate your receiver as explained in the Crystal Calibrator manual.

**INSTALLING AN ANTENNA**

A good antenna will enable you to obtain maximum performance from your receiver. A half-wave dipole is recommended for top performance on a particular band of frequencies such as an amateur band. A single wire antenna of between 30 to 50 feet provides the best all-round reception for short-wave listening.

If you prefer to use a single-wire antenna, see Figure 36 for suggested installation. For the exact specifications of a half-wave dipole antenna, see the section on antennas in the "Amateur Handbook," published by the ARRL.



Regardless of the type antenna used, it is always advisable to mount the antenna as high as possible. Height adds to the effectiveness of the antenna.

**HEADPHONES**

If you wish to use headphones instead of the loudspeaker, simply plug the phones in the jack labeled PHONES. This automatically mutes the loudspeaker. The impedance of the headphones is not critical. Headphones with impedances ranging from 3Ω to 2000Ω will work satisfactorily.





For the beginning Amateur operator or new short wave listener, we suggest that these instructions be followed closely. The extra care used in tuning will be well rewarded by bringing in many distant (DX) stations. The section on the best time for shortwave listening will also be very helpful.

### CONTROL SETTINGS FOR STANDARD BROADCAST RECEPTION

STANDBY-MVC-AVC-CAL AVC

BFO OFF

BAND A

MAIN TUNING

Turn dial to desired station. (Bandspread dial must be turned all the way to the right.)

**BANDSPREAD:** Not needed for local stations. Use for fine tuning for DX (distant) reception.

**ANTENNA CONTROL:** Adjust for strongest signal.

**VOLUME:** Adjust for desired volume.

### CONTROL SETTINGS FOR SHORT WAVE LISTENING

Set controls same as for standard broadcasts above, except:

#### PHONE RECEPTION

**BAND:** Switch to B, C, D or E depending on frequency of station wanted.

**BANDSPREAD:** Set to SET MAIN TUNING.

**MAIN TUNING:** Turn dial to desired station. For Amateur phone reception, set the MAIN TUNING dial at the index mark for the desired Amateur band (80M-40M-20M-15M-10M-6M). Then tune in stations on the calibrated BANDSPREAD scale.

**6-METER RECEPTION:** Set the BANDSWITCH to band E. Set the MAIN TUNING dial to the 6-meter mark on band D. Tune in stations on the calibrated BANDSPREAD scale.

### CW (CODE) RECEPTION

BFO ON

BAND Set to desired band

VOLUME full

STANDBY-MVC-AVC-CAL MVC (must always be in this position for CW reception)

**MAIN TUNING:** Set the MAIN TUNING dial at the index mark for the desired Amateur band.

**BANDSPREAD:** Slowly turn the BANDSPREAD dial until the desired station is heard.

**BFO:** Adjust the BFO control for the most pleasing note.

### AMATEUR FREQUENCIES

BAND SETTING	AMATEUR BAND	FREQUENCY RANGE
B	80M	3.5 - 4.0mc
C	40M	7.0 - 7.3mc
C	20M	14.0 - 14.35mc
D	15M	21.0 - 21.45mc
D	10M	28 - 29.7mc
E	6M	50 - 54mc

### SINGLE SIDEBAND RECEPTION

**MAIN TUNING:** To index mark for desired Amateur band.

**BANDSPREAD:** Precedence has established the use of SSB transmitters in certain sections of each Amateur band. At the present time, these are:

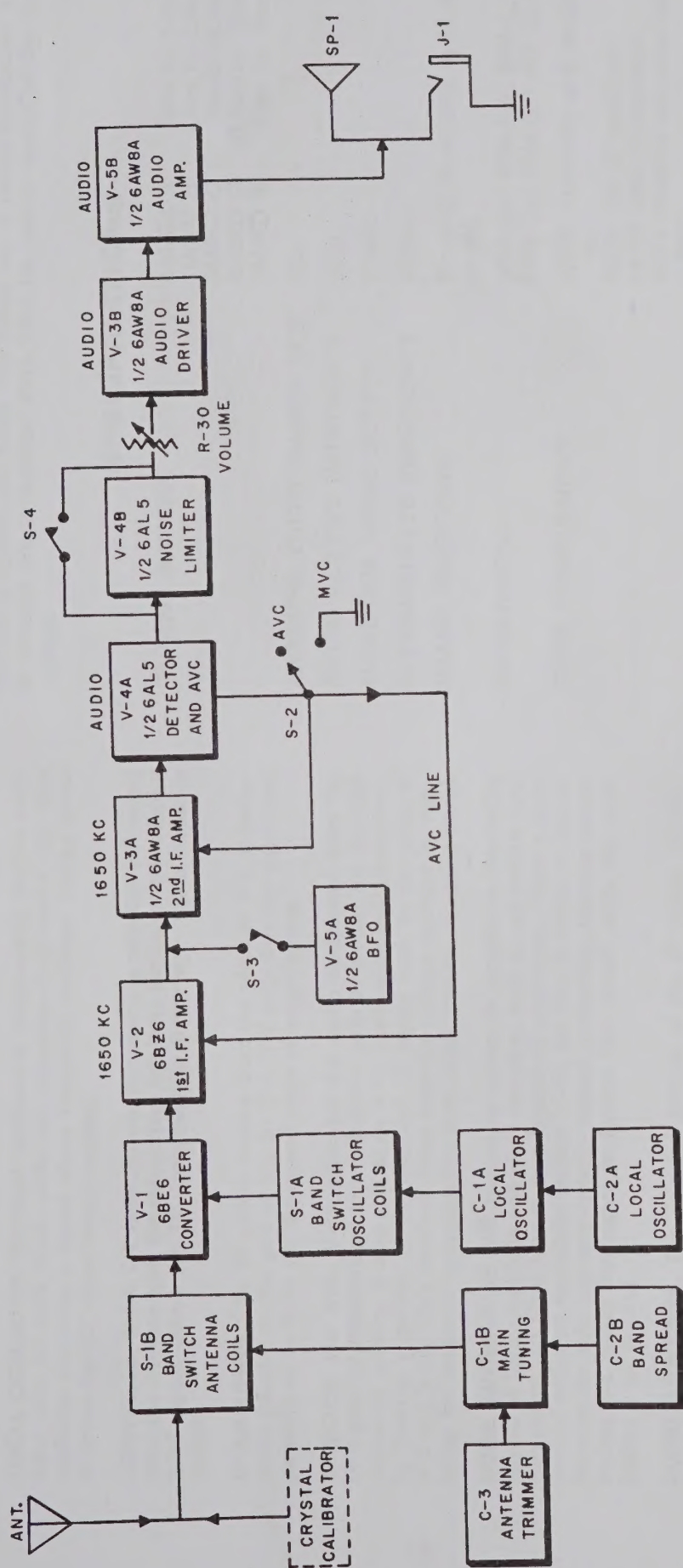
80 meter band	high frequency end
40 meter band	high and low freq. ends
20 meter band	high frequency end
15 meter band	high frequency end
10 meter band	around 28.65mc
6 meter band	low frequency end

A standard AM transmitted signal consists of an RF carrier and two sidebands, which results from the modulation of the RF carrier. A SSB signal is characterized by the suppression of the carrier and one of the side bands. Thus the transmitted signal consists of one sideband only. It is fast becoming an increasingly popular method of transmission because it occupies less space in the radio spectrum and because there





FIGURE 37









the resonant point of the receiver slightly to either side of the setting on the main tuning dial.

**ANTENNA TRIMMER.** Capacitor C-3 is in parallel with the main tuning and bandsread capacitors. When rotated, this capacitor more accurately tunes the antenna circuit to the desired signal frequency, resulting in a louder and more readable signal.

**LOCAL OSCILLATOR.** The local oscillator is composed of the five oscillator (one for each band) coils and capacitors C-1B and C-2B. This oscillator generates a signal whose frequency is always 1650kc above or below the RF signal being received.

**CONVERTER.** Tube V-1 heterodynes or mixes the selected RF signal from the antenna with the signal from the local oscillator to produce a third signal called the IF (intermediate frequency) whose value is 1650kc.

**IF AMPLIFIERS.** The IF signal, coming from the plate of V-1, is inductively coupled to the grid of V-2 by T-1. V-2 amplifies this signal and passes it on to V-3A for the second stage of amplification.

**DETECTOR and AVC.** V-4A separates the audio component from the IF signal by furnishing a low impedance path to ground for the high frequency portion. It also acts as an AVC (automatic volume control) by feeding a portion of the detected IF signal back to the grids of V-2 and V-3A. This feedback helps keep the volume constant by regulating the amount of amplification these tubes give the incoming signal.

**NOISE LIMITER.** V-4B will remove or reduce in amplitude interfering signals of high amplitude and short duration, such as automobile ignition noises and disturbances from household appliances. When a noise peak of sufficient amplitude reaches V-4B, the tube is driven to cut-off. Because the tube has momentarily ceased conducting, limiting occurs. Switch S-4 allows the signal to bypass this circuit when the noise limiter is not needed.

**AUDIO AMPLIFIERS.** The detected portion of the IF signal (audio) goes through R-50 (volume control) and onto the grid of V-3B, audio driver. The signal is amplified and passed onto the grid of V-5B, audio amplifier, where it receives sufficient amplification to drive loudspeaker SP-1 or a pair of headphones plugged into J-1.

**BFO.** L-11, C-14 and V-5A form the beat frequency oscillator. The BFO generates a signal whose frequency is equal to the IF (1650kc). By rotating C-14, the frequency of the BFO can be varied about 3kc. When the BFO signal is heterodyned with the IF signal an audible

tone can be heard in the loudspeaker. This tone is the difference between the IF and BFO frequencies. The heterodyning of these signals is accomplished at V-3A. Switch S-3 removes the BFO from the circuit when not needed.

**POWER SUPPLY.** The built-in power supply is operated from 117 volts AC 50/60 cycle house current. It supplies the DC and filament voltages needed to operate the tubes. The center tap of power transformer T-5 is brought out to terminal strip TS-2 for remote control of the B+ voltage.

## SPECIFICATIONS

### TUNING RANGES

BAND A	.53mc to 1.9mc
BAND B	1.8mc to 6.3mc
BAND C	6mc to 14.5mc
BAND D	11.5mc to 33mc
BAND E	47mc to 54mc

ANTENNA INPUT IMPEDANCE 52 $\Omega$

AUDIO OUTPUT IMPEDANCE 3.2 $\Omega$

MAXIMUM AUDIO OUTPUT 1 watt

INTERMEDIATE FREQUENCY 1650kc

IMAGE REJECTION From 42 db at 80M to 14 db at 6M

### SENSITIVITY

80M-4 $\mu$ v; 40M-6 $\mu$ v; 20M-8 $\mu$ v;  
15M-7 $\mu$ v; 10M-6 $\mu$ v; 6M-10 $\mu$ v.

TUBE COMPLEMENT 6BE6 (converter and oscillator)

6BZ6 (1st IF amplifier)

6AW8 (2nd IF amplifier)

6AL5 (detector and noise limiter)

6AW8 (audio output and BFO)

EZ90 (rectifier)

60 watts, 117v, 60 cycle

11" deep, 14 $\frac{1}{4}$ " wide, 8 $\frac{5}{8}$ " high.

19 lbs.

### POWER CONSUMPTION

### DIMENSIONS

### NET WEIGHT







## WHEN TO LISTEN

Under normal atmospheric conditions, with patience and practice, it's possible to hear stations from all over the world in a single evening—at times even within a few minutes. All you need is your receiver, a good antenna, a knowledge of *where* and *when* to listen—plus persistence.

Short-wave radio transmitters include land communications stations, maritime stations, aeronautical stations, Amateur (Ham) stations, and broadcasting stations. Of these, the broadcasting and Amateur (Ham) stations are of most interest to the short-wave listener (SWL). However, there are many other "specialties" to listen to such as international radio telegraph or telephone point-to-point communications; shipping and coastal radio; plane and ground communications; weather station reports and time signals; special expeditions, and other unusual events.

By international agreement, each type of station is assigned certain bands for operations.

You'll find that the short-wave portions of the dial on your receiver are calibrated in megacycles. A megacycle is 1000 kilocycles (kc).

Short-wave stations operate in these megacycle bands—5.95 to 6.20mc; 7.0 to 7.3mc amateur band; 9.5 to 9.8mc; 11.7 to 12.0mc; 14.0 to 14.3mc amateur band; 15.10 to 15.45mc; 17.5 to 17.7mc and 28.0 to 29.7mc amateur band. Sometimes these bands are given in terms of meters (m)—such as the 49, 41, 50, 31, 25, 20, and 19 meter bands. Thus, **megacycles** refer to **frequency**; **meters** refer to **wavelength**.

Reception conditions on each of the short-wave broadcast bands vary a lot at different times of the day and night, and also at different seasons of the year. Experience will teach you when to listen on each band.

In general, for SWL's in North America, the best reception on each of these bands during the fall and spring months should be:

The 6mc band—evening for Latin America and Europe.

The 7mc bands—late afternoon and evening for Europe; evening and early morning for Amateur stations.

The 9mc band—morning (6 to 8 a.m. your local time) for Asia and Australia; afternoon for Europe and Africa; evening for Europe and Latin America.

The 11mc band—morning (6 to 9 a.m. your local time) for Asia and Australia; afternoon for Europe and Africa; evening for Latin America.

The 14mc band—late morning and afternoon for Amateur stations.

The 15mc band—morning and afternoon for Europe and North America; evening for North and South America.

The 29mc band—daylight hours for Amateur stations.

During the winter months, the best bands for evening reception are lower than during the fall and spring. For instance, the 9mc band becomes poor for reception from Europe during the evening hours, and the 6mc band becomes the best band for European reception. However, the 29mc Amateur band is best during winter months, especially at the peak of the sunspot cycle.

In the summer months, the best evening reception shifts to the higher bands. Evening reception from Europe becomes good in the 11mc band, although the 9mc band remains good for reception from that area.

Year-around DX (Distant reception) bands are the 9mc and 11mc bands, although consideration there must be given to receiving different parts of the world best in summer or winter.

The expected reception just outlined is for normal conditions. The factors which affect long-distance radio transmissions vary from day to day. On some days, for instance, reception will be quite good, but at times, generally for periods of several consecutive days, transmission conditions will be "disturbed" and only the more powerful stations can be heard.

Here's a special caution: Short-wave broadcasting stations often change their schedules and/or frequencies with little or no prior notice. Always be on the alert for announcements of such changes.

## HOW IT WORKS

**BAND SELECTION.** By rotating band switch S-1A (see block diagram), one of the five antenna coils is switched into the antenna circuit which has the ability to accept a given band of frequencies and reject all others.

**TUNING.** Tuning capacitor C-1A is wired in parallel with the switched antenna coil, forming a parallel resonant circuit. When this capacitor is set for some specific value, it tunes in a signal corresponding in frequency to the pointer setting on the main tuning dial. The remaining frequencies in the band are rejected.

**BANDSPREAD.** The bandspread capacitor C-2A is connected in parallel with the main tuning capacitor. When rotated, this capacitor changes





**BFO**

STANDBY-MVC-AVC-CAL set to MVC

BFO set to ON

Tune to a strong signal on any band except the broadcast band (A). As you rotate the BFO control a whistle should be heard. If not, adjust L-11 from the top of the chassis.

## ALIGNMENT WITH INSTRUMENTS

### EQUIPMENT REQUIRED

Voltmeter capable of reading down to 0.5 volts AC.

Signal generator with ranges from 530kc to 54mc, 30% modulation at 400 cycles.

300  $\mu$ f capacitor.

### SEE FIGURE 33.

Connect the coaxial cable to the generator as shown.

Connect one lead of the 300  $\mu$ f capacitor to the ANT terminal. Connect the other lead to the center conductor of the coaxial cable coming from the signal generator. Connect the shield wire of the cable to the GR terminal of the receiver.

Connect the leads of the voltmeter to the speaker terminals.

STANDBY-MVC-AVC-CAL set to MVC

NOISE LIMITER set to OFF

BFO set to OFF

**NOTE:** As the MAIN TUNING pointer is moved up scale, the ANTENNA control should be increased proportionately. That is, when the MAIN TUNING pointer is at the high end of the band the ANTENNA control should be almost fully clockwise (open); at the center of the band the ANTENNA control should be at mid-rotation; at the low end of the band the ANTENNA control should be almost fully counterclockwise (closed).

Follow the instructions on the alignment chart.

## ALIGNMENT CHART

BAND	MAIN TUNING MC	BAND SPREAD	SIGNAL GENERATOR MC	ANTENNA CONTROL	ADJUST FOR MAXIMUM
A	.53	SET MAIN TUNING	1.65	*OPEN	T-3 TOP & BOTTOM
A	SAME	SAME	SAME	SAME	T-2
A	SAME	SAME	SAME	SAME	T-1
REPEAT FIRST THREE STEPS					
A	.53	SET MAIN TUNING	.53	**CLOSED	L-6
A	1.9	SAME	1.9	OPEN	C-6
REPEAT ABOVE TWO STEPS					
A	.6	SET MAIN TUNING	.6	ALMOST CLOSED	L-1
B	1.9	SAME	1.9	SAME	L-7
B	2.5	SAME	2.5	1/4 OPEN	L-2
C	6.0	SAME	6.0	SAME	L-8
C	6.0	SAME	6.0	SAME	L-3
D	11.5	SAME	11.5	SAME	L-9
D	11.5	SAME	11.5	SAME	L-4
E	6M	50	50	ALMOST OPEN	L-10
***SET GENERATOR AT 46.8Mc AND CHECK FOR IMAGE					
E	6M	50	50	ALMOST OPEN	L-5

\*OPEN means clockwise.

\*\*CLOSED means counterclockwise.

\*\*\*Leave MAIN TUNING at 50 Mc and set generator at 46.8 Mc. An image of the tone heard at 50 Mc should be heard at reduced volume. If you cannot hear this image, L-10 is tuned incorrectly.





For alignment of all bands, the controls should be set as follows unless otherwise stated.

VOLUME set to maximum

BFO set to OFF

NOISE LIMITER set to OFF

STANDBY-MVC-AVC-CAL set to MVC

BANDSPREAD pointer set to SET MAIN TUNING

BAND SWITCH set to band being aligned

**I.F. ALIGNMENT.** See Figure 32.

#### BAND A

**.53mc to 1.9mc (broadcast band)**

Connect an antenna to terminal 1 of TS-1 (marked ANT on the chassis). See section on antenna.

Plug the AC line cord in a 110 v. 60 cycle outlet.

At the low end of BAND A tune in a local broadcast station with the MAIN TUNING dial.

Insert the plastic tuning rod through the top of T-3 until it engages the bottom tuning slug. Adjust this slug for maximum volume, then adjust the top tuning slug for maximum.

Similarly adjust T-2, then T-1.

**NOTE:** L-1 to L-10 have been preadjusted at the factory. Only a slight adjustment will be necessary to peak these coils. These adjustments are made from the bottom of the chassis with the bottom cover attached.

#### BAND A

At the HIGH END of the band, tune in a local broadcast station whose frequency of transmission is known.

Simultaneously adjust the MAIN TUNING and C-6 until the signal being received is loudest and at the correct location on the dial.

Tune in a known frequency at the LOW END of the band.

Simultaneously adjust the MAIN TUNING and L-6 until the signal being received is loudest and at the correct location on the dial.

Without changing the MAIN TUNING dial, adjust L-1 for maximum volume. Because of interaction between C-6 and L-6 it will be necessary to repeat these adjustments several times for best accuracy.

#### BAND B

**1.8mc to 6.3mc (80 meters)**

Rotate the ANTENNA control until it is almost counterclockwise.

Tune in station WWV at 5mc. In some areas, WWV can only be received at night.

Simultaneously adjust the MAIN TUNING and L-7 until WWV is loudest and the dial pointer reads 5mc.

Adjust L-2 for maximum volume.

#### BAND C

**6mc to 14.4mc (20 and 40 meters)**

ANTENNA control to center of rotation.

Tune to station WWV at 10mc.

Simultaneously adjust the MAIN TUNING and L-8 until WWV is loudest and the dial pointer reads 10mc.

Tune L-3 for maximum volume.

#### BAND D

**11.5mc to 33mc (10 and 15 meters)**

ANTENNA control almost fully counterclockwise.

Tune to station WWV at 15mc. WWV can be received best during the day.

Simultaneously adjust MAIN TUNING and L-9 until WWV is loudest and the dial pointer reads 15mc.

Tune L-4 for maximum volume.

#### BAND E

**47mc to 54mc (6 meters)**

ANTENNA control almost fully clockwise.

MAIN TUNING set to 6 METERS.

Rotate the BANDSPREAD to a strong signal of known frequency.

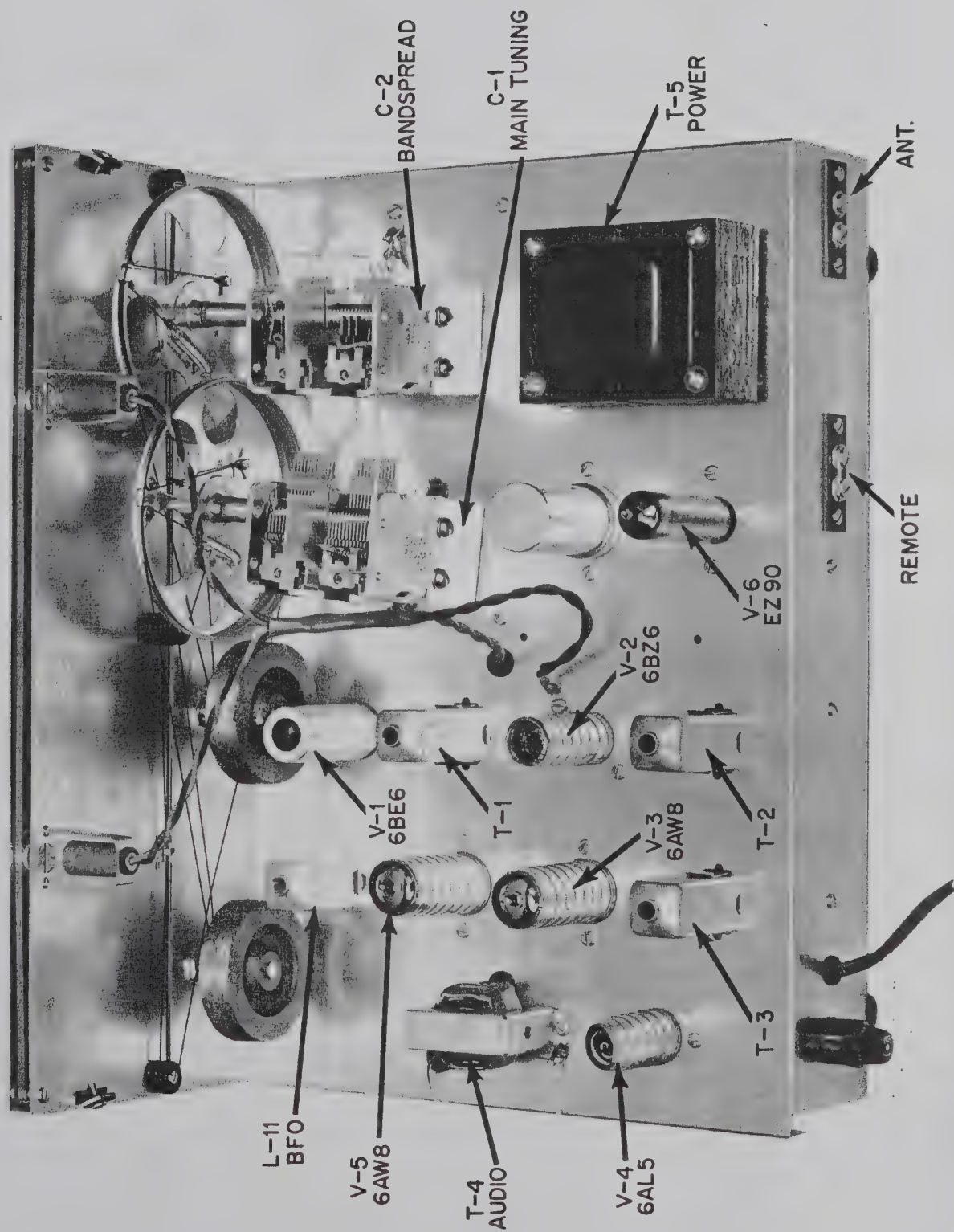
Simultaneously adjust the BANDSPREAD and L-10 until the signal is loudest and at the correct location on the BANDSPREAD dial.

Tune L-5 for maximum volume.





FIGURE 32







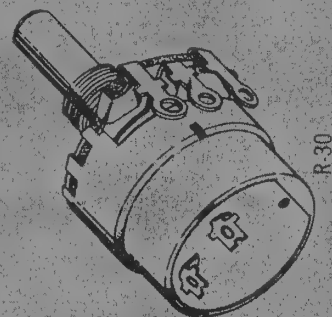
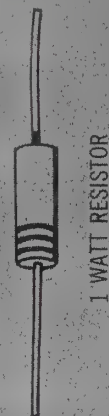
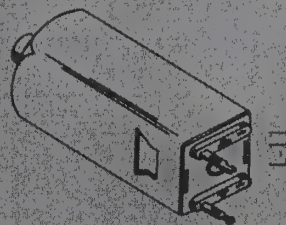
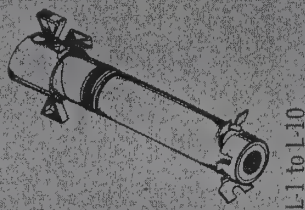


## COILS

Symbol Number	Description	Part Number
L-1	band A Antenna coil	162033
L-2	band B Antenna coil	162034
L-3	band C Antenna coil	162035
L-4	band D Antenna coil	162036
L-5	band E Antenna coil	162037
L-6	band A Oscillator coil	162038
L-7	band B Oscillator coil	162039
L-8	band C Oscillator coil	162040
L-9	band D Oscillator coil	162041
L-10	band E Oscillator coil	162042
L-11	BFO coil	162032
L-12	Choke coil	140003

## RESISTORS

R-1	22K	301223
R-2	12K, 2 watt	307123
R-3	2.7K	301272
R-4	100K	301104
R-5	180Ω	301181
R-6	22K	301223
R-7	47K	301473
R-8	39K	301393
R-9	100K	301104
R-10	220K	301224
R-11	1.8K	301182
R-12	100K	301104
R-13	4.7 meg	301475
R-15	2.7K	301272
R-16	220K	301224
R-17	1 meg	301105
R-18	180Ω	301181
R-19	47K	301473
R-20	1.3K, 5%	302132
R-21	2.2 meg	301225
R-22	47K	301473
R-23	470K	301474
R-24	150Ω	301151
R-25	10K, 1 watt	304103
R-26	100K	301104
R-27	470K	301474
R-28	470K	301474
R-29	470K	301474
R-30	1 meg control with switch	390005
R-31	33Ω	301330
R-32	1 meg	301105
R-33	100Ω, 1 watt	304101
R-34	100K	301104
R-35	330Ω, 1 watt	304331







## PARTS LIST

Symbol Number	Description	Part Number
S-1	band switch and bracket.....	040084
S-2	STANDBY-MVC-AVC-CAL switch .....	432137
S-3	BFO .....	431003
S-4	noise limiter .....	431003

## SWITCHES

## Description

Symbol  
Number

Symbol Number	Description	Part Number
S-1	band switch and bracket.....	040084
S-2	STANDBY-MVC-AVC-CAL switch .....	432137
S-3	BFO .....	431003
S-4	noise limiter .....	431003

## TERMINAL STRIPS

TS-1	2-screw terminal .....	441201
TS-2	2-screw terminal .....	441201
TS-3	3-terminal .....	440301
TS-4	4-terminal .....	440401
TS-5	4-terminal .....	440401
TS-6	3-terminal .....	440301
TS-7	6-terminal .....	440602
TS-8	6-terminal .....	440601
TS-9	2-terminal .....	440202

## TRANSFORMERS

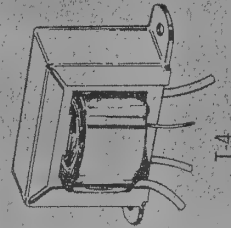
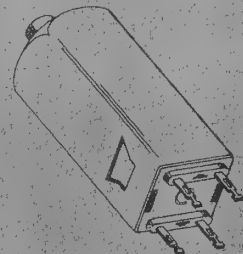
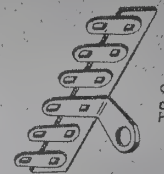
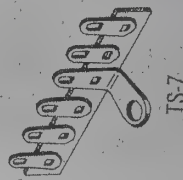
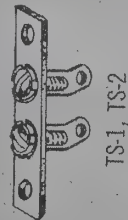
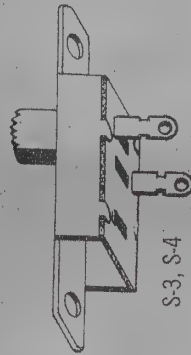
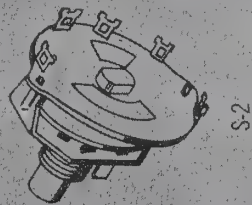
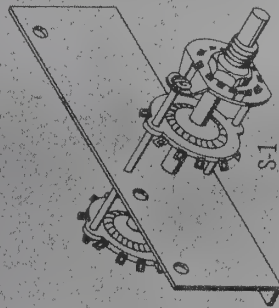
T-1	IF transformer .....	122216
T-2	IF transformer .....	122217
T-3	IF transformer .....	122218
T-4	Output transformer .....	102218
T-5	Power transformer .....	101325

## TUBES

V-1	6BE6 .....	610045
V-2	6BZ6 .....	610050
V-3	6AW8A .....	611026
V-4	6AL5 .....	611005
V-5	6AW8A .....	611026
V-6	EZ90/6X4 .....	610023

## MISCELLANEOUS

Description	Quantity	Part Number
Bracket, for bandspread and main tuning capacitors ..	2 .....	470283
Bracket, for antenna coils .....	1 .....	470285
Bracket, for oscillator coils .....	1 .....	470286
Bracket, shield .....	1 .....	470284



T-1, T-2, T-3

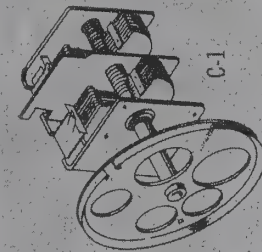
T-4



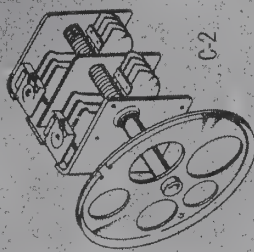


## CAPACITORS

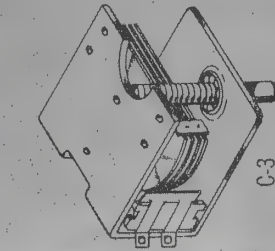
Symbol Number	Description	Part Number
C-1	Main tuning capacitor	282021
C-2	Bandsread	282022
C-3	Antenna trimmer	281022
C-4	75 $\mu\text{f}$ , 5% silver mica	264759
C-5	20 $\mu\text{f}$ , disc	296014
C-6	3-50 $\mu\text{f}$ , trimmer	283005
C-7	500 $\mu\text{f}$ , 5% silver mica	294008
C-8	.001 $\mu\text{f}$ , disc	276016
C-9	.05 $\mu\text{f}$ , disc	275506
C-10	.0047 $\mu\text{f}$ , disc	276477
C-11	.05 $\mu\text{f}$ , disc	275506
C-12	.02 $\mu\text{f}$ , disc	276025
C-13	6.2 $\mu\text{f}$ , 5% disc	296033
C-14	BFO adjustment	281023
C-15	100 $\mu\text{f}$ , silver mica	266017
C-16	.01 $\mu\text{f}$ , disc	276015
C-17	.01 $\mu\text{f}$ , disc	276015
C-18	1000 $\mu\text{f}$ , silver mica	266014
C-19	150 $\mu\text{f}$ , disc	276158
C-20	10 $\mu\text{f}$ , disc	276018
C-23	.05 $\mu\text{f}$ , disc	275506
C-24	470 $\mu\text{f}$ , disc	276478
C-25	50 $\mu\text{f}$ , electrolytic 10v	221500
C-27	.01 $\mu\text{f}$ , disc	276015
C-28	.001 $\mu\text{f}$ , 5% disc	276016
C-29	.01 $\mu\text{f}$ , disc	276015
C-30	470 $\mu\text{f}$ , 5% disc	276478
C-31	50 $\mu\text{f}$ , electrolytic 10v	221500
C-32	100 $\mu\text{f}$ , disc	276017
C-33	.01 $\mu\text{f}$ , disc	276015
C-34	.01 $\mu\text{f}$ , disc	276015
C-35	.01 $\mu\text{f}$ , disc	276015
C-36	40-40-40-40 $\mu\text{f}$ , electrolytic 350v	236404
C-37	.001 $\mu\text{f}$ , disc	276016
C-41	620 $\mu\text{f}$ , 5% silver mica	264628
C-42	.01 $\mu\text{f}$ , disc	276015
C-43	.01 $\mu\text{f}$ , disc	276015
C-44	.01 $\mu\text{f}$ , disc	276015
C-45	.01 $\mu\text{f}$ , disc	276015



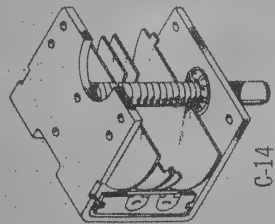
C-1



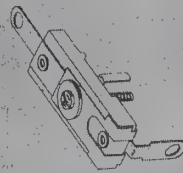
C-2



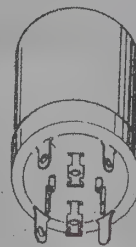
C-3



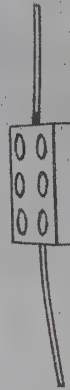
C-14



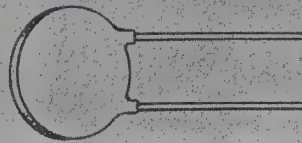
C-6



C-36



C-4, C-7, C-41



DISC



C-15, C-18





## MISCELLANEOUS (Continued)

Description	Quantity	Part Number
Bracket, for C-3	1	470289
Bracket, trimmer	1	470288
Cabinet	1	700067
Chassis	1	461355
Clip, IF can	4	532008
Dial light bulb, #51	2	640007
Dial string, 6'	2	860017
Flywheel	2	480004
Foot, rubber	4	831001
Fuse, 1 amp.	1	491001
Fuse holder	1	492200
Grommet, 1/4"	8	830001
Grommet, 3/16"	6	830100
Grommet, 3/8"	1	830200
Jack, headphone	1	502228
Knob, large	2	761400
Knob, large with white dot	2	761304
Knob, small with white dot	3	761004
Manual	1	750265
Panel, front	1	462247
Panel, plexiglass	1	462704
Panel, sub	1	470287
Plate, bottom	1	463310
Plate, electrolytic mounting	1	501542
Pointer, red	1	470291
Pointer, green	1	470293
Pulley, plastic	4	880014
Rubber pad	1	840011
Shaft, tuning	2	470281
Shield braid, 2 1/2"	2	804133
Shield, for V-1	1	510006
Shield, ribbed for V-2, 2"	1	510002
Shield, ribbed for V-4	1	510012
Shield, 9-pin tube, ribbed	2	510003
Shield, saddle	1	511005
Socket, 7-pin molded	1	501170
Socket, 7-pin wafer	1	501072
Socket, 7-pin wafer with shield clip	2	501073
Socket, 9-pin wafer with shield clip	2	501093
Socket, dial light	2	501731
Spacer, paper	2	850063
Speaker, 3 1/2"	1	730022
Spring	2	470076
Tuning tool	1	957007

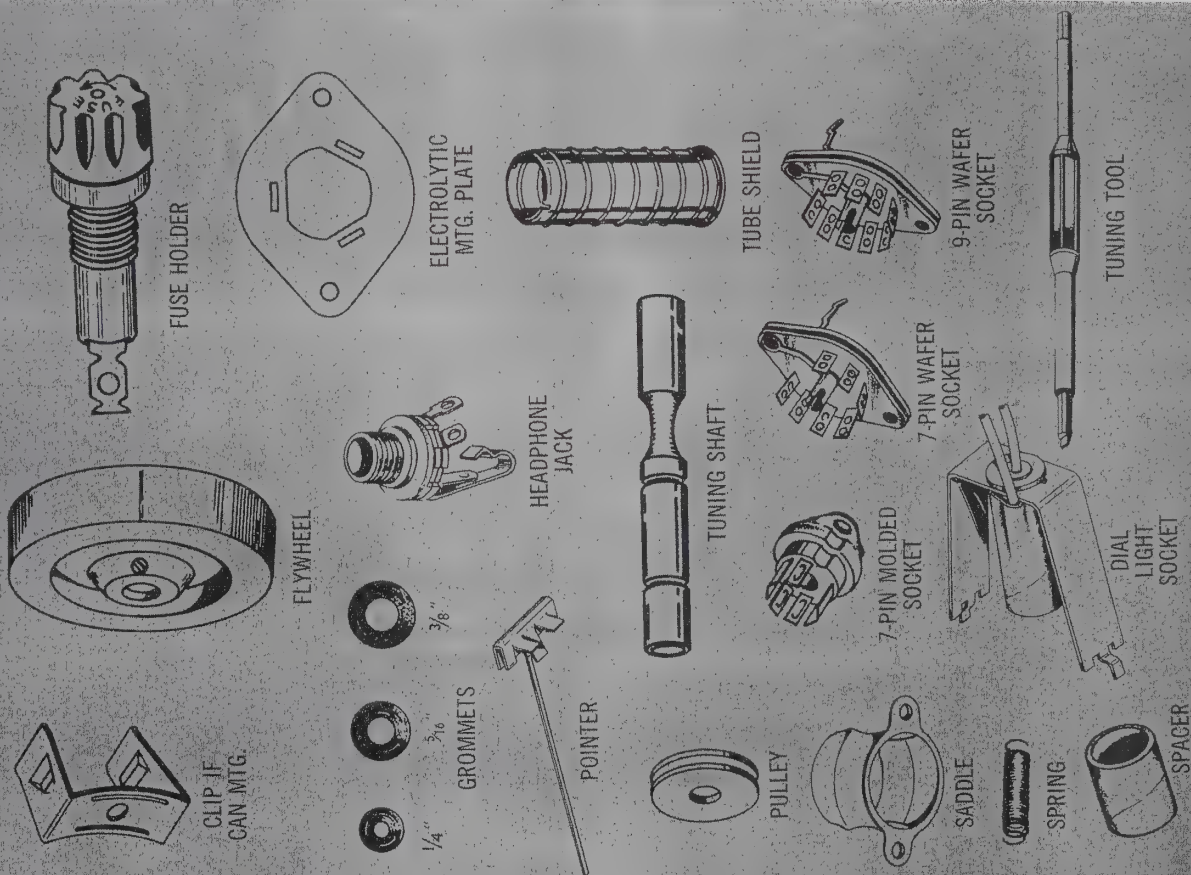






FIGURE 2

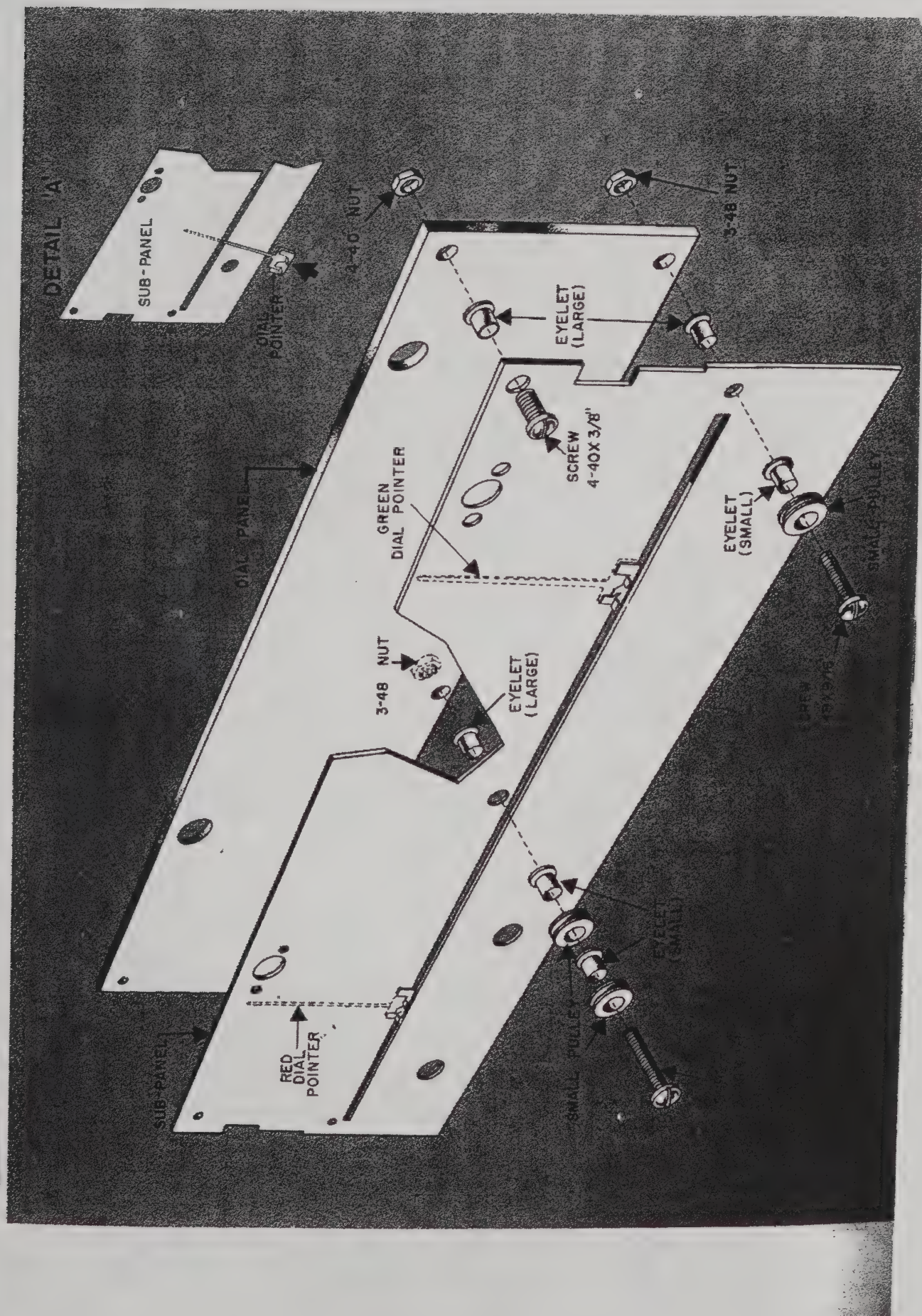
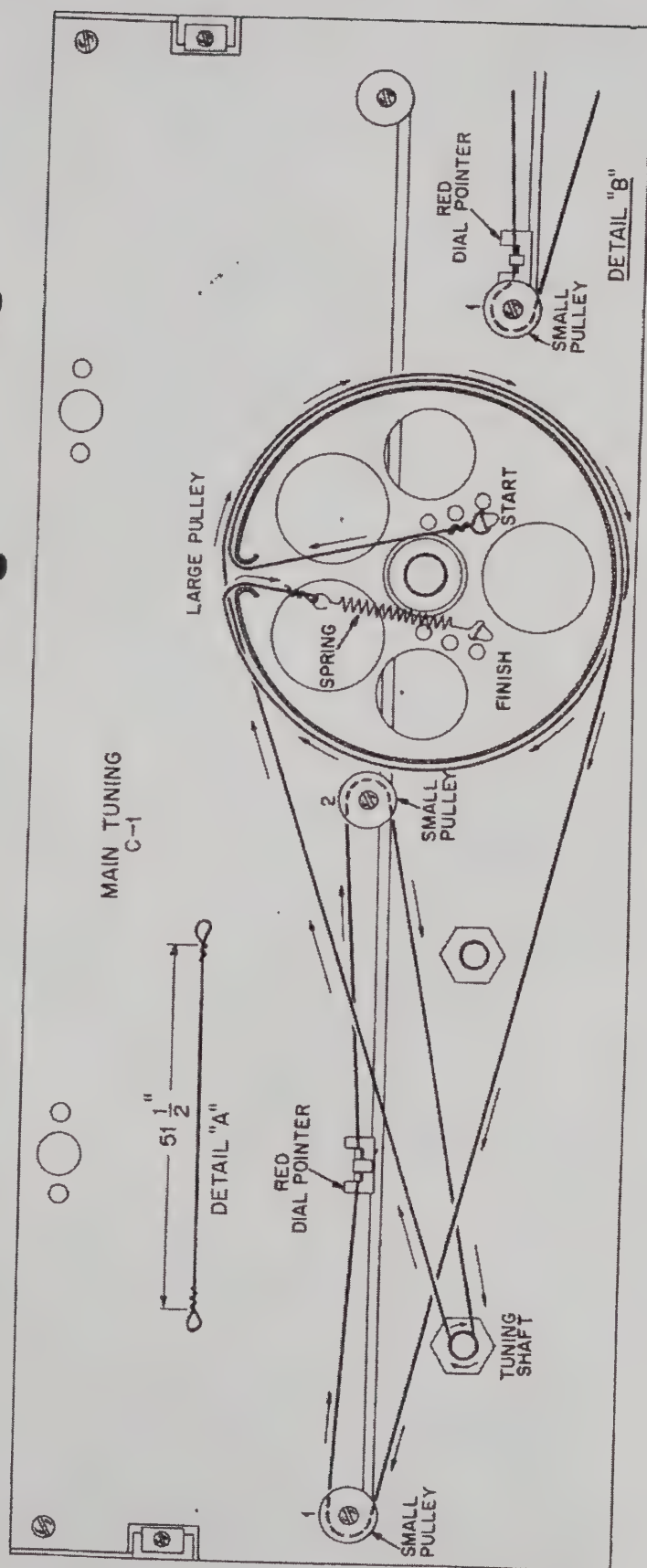
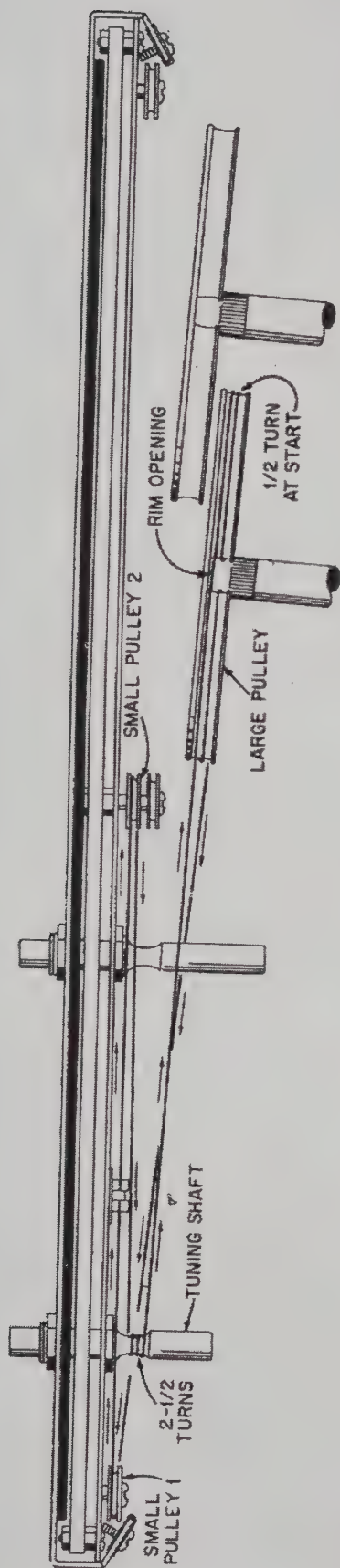
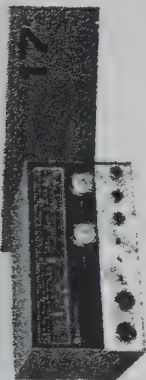




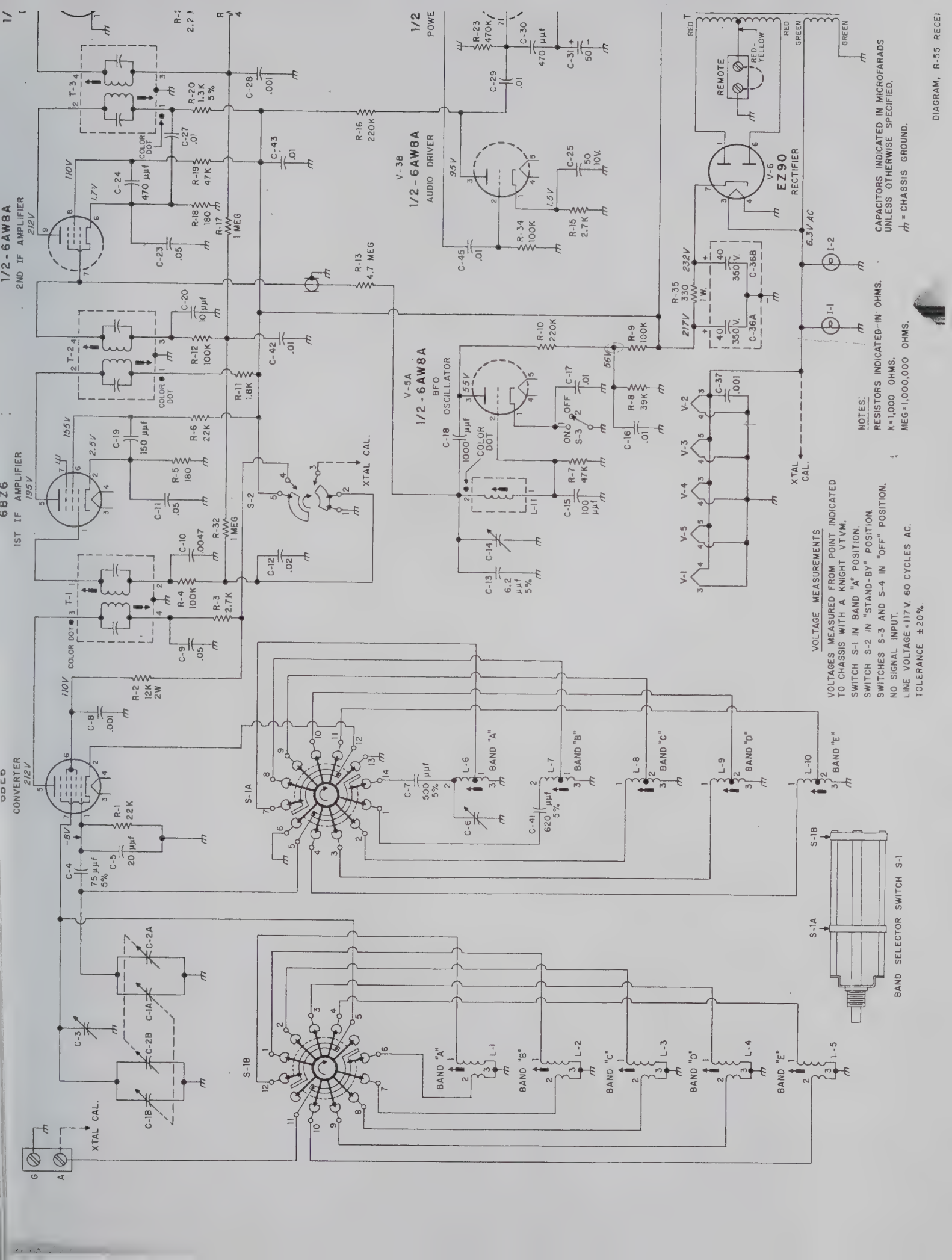


FIGURE 18



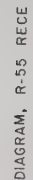






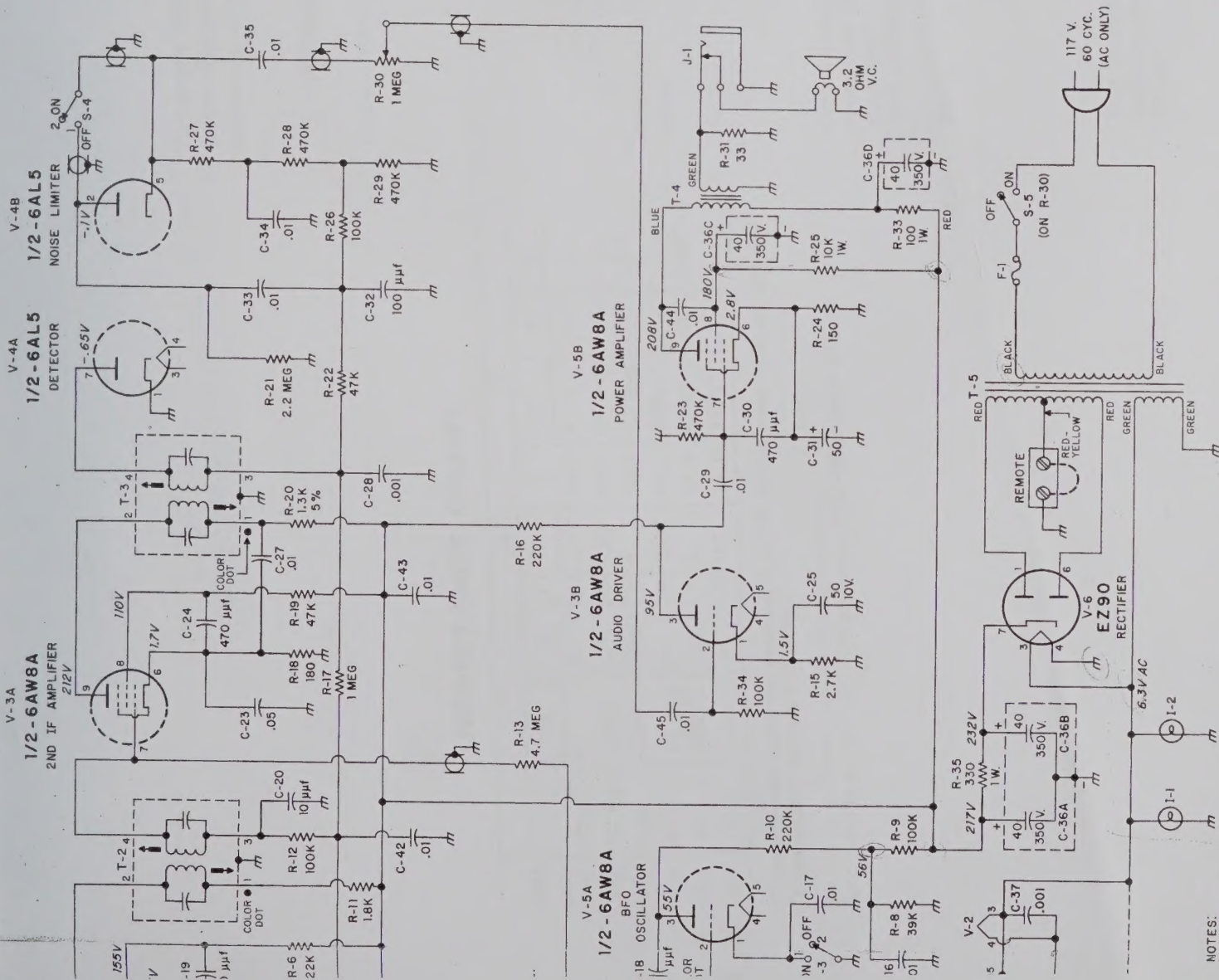
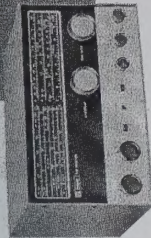








# SCHEMATIC



NOTES:  
RESISTORS INDICATED IN OHMS.  
K=1,000 OHMS.  
MEG=1,000,000 OHMS.  
CAPACITORS INDICATED IN MICROFARADS  
UNLESS OTHERWISE SPECIFIED.  
CH = CHASSIS GROUND.







The proper operating voltages are found on the circuit diagram. The proper resistances are found in the resistance chart. Never measure resistances with the receiver turned on.

RESISTANCE CHART

TUBE	PIN								
	1	2	3	4	5	6	7	8	9
V-1	22K	0	0	0	2.7K*	10K*	0	....	....
V-2	1.7 Meg	180Ω	0	0	1.8K*	22K*	0	....	....
V-3	2.7K	100K	220K*	0	0	180Ω	1.7 Meg	47K*	1.3K*
V-4	0	2.2 Meg	0	0	200K	N.C.	620K	....	....
V-5	∞	4.7K	320K*	0	0	150Ω	470K	10K*	600Ω*
V-6	145Ω	N.C.	0	0	N.C.	145Ω	330Ω*	....	....

All measurements made with reference to chassis ground unless otherwise specified.  
\*Measured from terminal 2 of C-36.

Set controls as follows for resistance measurements:  
Band switch to A—BFO OFF—Volume open—AVC—Noise limiter OFF

TROUBLE	POSSIBLE CAUSE	SERVICE PROCEDURE
Receiver dead	Defective tube (s)	Replace defective tubes.
	Tubes in wrong sockets or not seated. Line cord not in AC outlet	Visual inspection
	Fuse open	Check fuse. Look for power supply shorts.
Poor sensitivity on all bands	Low B + voltages	Check C-36
	Defective tubes	Check tubes
	IF stages misaligned	Realign.
Output distorts on strong AM signals when receiver is in AVC position	AVC line is grounded	Check S-2 wiring.
HUM	Open filter capacitor. Shorted tube. Short circuit which draws excessive current	C-36 defective. Test tubes. Look for wrong connections and uninsulated wires shorting.
	Bad 6AW8A	Replace tube.
Beat frequency oscillator does not function	L-11 not properly adjusted	Readjust L-11.

